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SOME NEW CHRYSOMELIDAE, WITH NOTES ON OTHER SPECIES) (COLEOPTERA) *

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In the following notes, two European species, one a pest of *Lilium*, are recorded for the first time from North America; an European pest that was introduced into the United States is recorded from Canadian localities; and a Mexican species not noted previously from the United States is recorded from Texas. The five forms described as new belong to difficult groups in which the species show strong monophagous tendencies.

Lilioceris lilii (Scop.)

Attelabus Lilii Scopoli, 1763, Entomologia Carniolica, p. 36.

This European species was found well established in Montreal in 1945. It was found in three back-yard gardens, situated more than a mile apart in the Outremont section, where it had done severe damage to regal lily, *Lilium regale* Wilson. The author visited two of the gardens on July 24. The regal lilies of one had lost about 75 per cent of their foliage and nearly all of their flowering shoots, while those of the other garden were damaged less severely. Both gardens had contained regal lilies for some years, but no insects were observed until 1945. On July 24, most of the larvae were half-grown or larger and most, if not all, of the adults were newly matured. Hatched eggs were found in irregular rows of from four to eight on the undersides of the leaves. The few very young larvae occurred on the undersides of the leaves, and they did not consume the upper epidermis when feeding. Larger larvae occurred on the upper sides and consumed all tissue.

The genus *Lilioceris* Reitter, 1912, Fauna Germanica, Käfer, IV, p. 79) was erected for *lilii* and two other European species which were formerly included in *Crioceris* Geoff. and which restrict their feeding to liliaceous plants. *Lilioceris* differs from *Crioceris* in having the pronotal sides deeply emarginate at middle as in some species of *Lema* Fab., and from *Lema* in having the tarsal claws diverging from the base as in *Crioceris*. *L. lilii* is a striking insect; the adults measure from 6 to 7.5 mm., and have the pronotum and elytra bright scarlet and the body beneath, antennae, head, and legs entirely black. In the larva, the abdomen is supplied with ambulatory warts as in other criocerids, and the dorsum is covered with dark, slimy excrement as in *Lema*.

According to European literature (see Fox-Wilson, 1942, Jour. Roy. Hort. Soc., 67:165-168), *lilii* is widely distributed in Europe and occurs in southwestern Siberia and in North Africa. It breeds sporadically in Great Britain but is not a permanent inhabitant of the country. It is an important pest of species of *Lilium*, especially of *L. candidum* L. and *L. Martagon* L., and occurs rarely on *Convallaria* (lily-of-the-valley), *Polygonatum* (Solomon's seal), and *Fritillaria* (fritillary). The adults winter in vegetable debris and emerge early in the spring. Each female lays about 300 eggs, and some females lay during two successive years. There are from one to three generations each year, the eggs requiring from 7 to 10 days, the larvae from 16 to 24 days, and the pupae, which are formed in the soil, 20 or 22 days.

In 1826, *Lema melanocephala* was described by Say (Jour. Ac. Nat. Sci. Philadelphia, 5:294) who wrote that his specimens came from the "N. W. Territory" and from T. W. Harris of Massachusetts. He wrote that his species was similar in form to *Lema trilineata* (Oliv.) but had the thorax and elytra "rufo-

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testaceous" and the head and entire underside black. As the scarlet of *lilii* fades more or less in museum specimens, Say's description fits that species very well. Schaeffer (1933, Jour. New York Ent. Soc., 41:301) has written that *melanocephala* remains unknown except for the original description. Thus one may suspect that Say's description was based on specimens of *lilii* that were incorrectly labeled or, in the case of the Harris specimens, that came from an introduction which did not persist.*

Arthrochlamys coryli n. sp.

Females only. Length from 3.8 to 4.1 mm. Bronze, the color constant; the underside and femora with numerous small areas that are more or less purple; antennae, labrum, and a spot within the emargination of each eye yellow, the spot always present but sometimes obscure, the apical halves of the antennae dark. Elytra moderately shining.

Pronotum like that of *eubati* Brown in every respect; the gibbosity relatively wide in its cephalic aspect and moderately deeply divided; the strigose sculpture finer than in *comptoniae* Brown but coarser than in *tecta* n. sp. and *alni* Brown; a few feeble punctures often evident on the anterior face and sides in certain lights. Elytra with the tubercles well developed, the juxta-scutellar rather feeble in several specimens; the strigose sculpture as in *tecta,* coarser than in *alni,* a trifle finer than in *eubati.*

Prosternal plate goblet-shaped. Metasternum with close, shallow, well defined foveae as in most of the species. Abdomen beneath with large, obsolete foveae as in other species; the apical segment with the surface irregular but never with defined foveae or punctures, the sculpture fine, close, subvermiculate in part; this vermiculate sculpture closer, much finer, and less well defined than in *eubati.* Pygidium punctate and finely subvermiculate, the sculpture as in *eubati* Tibiae lacking processes.

Food-plant: *Corylus americana* Walt.

Holotype: ♀, Walsingham, Ontario, May 30, 1944; No. 5613 in the Canadian National Collection.

Paratypes: 38 ♀, same locality, May 29 to June 20, 1944.

All specimens were taken from the food-plant by the author. This species is very similar to *A. eubati.* In the latter, the juxta-scutellar tubercles are feebly developed or scarcely evident, and the sculpture of the apical ventral segment differs as noted above. The present species occurs with *tecta* and may be distinguished from the latter as noted below.

Arthrochlamys tecta n. sp.

The name *tecta* is offered for a species of *Arthrochlamys* which seems to be indistinguishable morphologically from *A. bebbianae* Brown. *A. tecta* occurs on hazel, *Corylus americana* Walt., at Walsingham, in the Lake Erie District of Ontario. It was observed feeding and ovipositing on hazel, and it appeared to avoid entirely the willow, *Salix Bebbiana* Sarg., which grew sparingly near its food-plant. *A. bebbianae* is common in the Ottawa District and restricts its feeding to *S. Bebbiana,* avoiding entirely the other species of willows. It avoids, too, *Corylus cornuta* Marsh., the hazel of the Ottawa District.

In *tecta* the elytra are dull; they vary as in *bebbianae* from bronze to almost black, but they are nearly always purple or dark blue. The pronotum, body beneath, and legs are coppery and all of these parts, except the pronotum in a few specimens, have blue or purple areas. The pronotal gibbosity is relatively narrow, and the punctures of its anterior face and sides are distinct.

*Provancher redescribed *melanocephala* and recorded it from eastern Canada in 1877 (Petite Entomologique du Canada, vol. I. Coleopteres, p. 648). The Provancher Collection now contains a single faded specimen of *L. lilii* labelled *Lema melanocephala* Say. If this specimen, which bears no other label, is of Canadian origin, it is surely from an introduction which failed to persist.

The apical ventral segment is alutaceous and is roughened, usually strongly, by poorly defined foveae and punctures. In the male of *tecta*, each anterior tibia is supplied at the apex with two small, approximate, inwardly projecting, spur-like processes. Each anterior tibia in the female and each middle tibia in both sexes bears a single similar process. The male copulatory organ of *tecta* is like that of the holotype of *bebbianae* (see Brown, Canad. Ent., 75:119-131, 1943, and 76:70-72, 1944). The apex is acutely pointed, feebly deflexed, and prolonged well beyond the median orifice. The flagellum is about seven times as long as wide, and its basal orifice occupies about one-third of its length.

Holotype: ♂, Walsingham, Ontario, May 29, 1944; No. 5614 in the Canadian National Collection.

Allotype: ♀, same locality, June 14, 1944.

Paratypes: 6 ♂, 15 ♀, same locality, May 29 to June 21, 1944.

All specimens were taken from the food-plant, *Corylus americana* Walt., by the author.

At Walsingham, *tecta* occurred with *A. coryli*, which is described above. The two species differ in color, and they may be distinguished also by the form and sculpture of the pronotal gibbosity, by the sculpture of the apical ventral segment, and by the occurrence of tibial processes in the females of *tecta*.

As it is scarcely possible that a species which restricts itself to a single species of *Salix* in the Ottawa District would utilize *Corylus americana* as a food-plant in southernmost Ontario, *tecta* is considered here a cryptic species quite distinct from *bebbianae*, although indistinguishable from the latter by ordinary methods of study. However, *bebbianae* can feed on *Corylus*. On May 24, 1945, the author confined six copulating pairs of *bebbianae* on its natural food-plant and three pairs of *Corylus cornuta*. Both lots fed and copulated freely. Both lots began egg-laying on May 29, and both were discarded on June 27 because egg-laying had virtually ceased. During the period, the females on *Corylus* averaged 28 eggs each, and those on *Salix* averaged 42. This difference may be of no significance, as previous rearing has shown that females vary greatly in their ability to produce eggs. Eggs from both lots produced larvae which were reared on *Corylus*, mostly the European *C. avellana* L., although the larvae were given *C. cornuta* at times. After establishing themselves, the larvae suffered little mortality, and they produced adults that appeared normal. The adults emerged from their pupal cases from 38 to 50 days after the eggs hatched. In previous rearings, under similar conditions but on the natural food-plant, larvae showed similar mortality and required about the same time to mature.

Calligrapha fulvipes Stal.

Calligrapha fulvipes Stal, 1859, Öfvers. Kongl. Vet. Acad. Förhandl., p. 323; 1865, Mon. des Chrysomélides de l' Amér., III, p. 268; Jacoby, 1882, Biol. Cent. Amer., Coleop., VI (1), p. 205, pl. X, fig. 8, and 1891, Supplement, p. 246.

This Mexican and Central American species has not been recorded previously from the United States. The collection of Cornell University contains a single specimen labeled as having been taken at Kingsville, Texas, by C. T. Reed. In this species the elytra are pale with dark markings on each as follows: a sutural vitta in which there is a pale intrusion at the scutellum, a humeral lunule which partially encloses a rounded spot and, behind the lunule, a large, discal, slightly postmedian spot and eight or nine small spots. The elytral epipleura are entirely dark like the elytral markings, but the legs are pale. The terminal segments of the maxillary palpi are not strongly dilated in the male.

Plagiodera versicolora (Laich.)

This European species was found first in North America on Staten Island in 1911. Within a few years, it spread into New Jersey and eastern Pennsylvania and was noticed as a pest of poplars and willows (see Weiss and Dickerson, 1917, Canad. Ent., 49:104-109). It was taken first in Connecticut in 1921 (1927, Conn. Agr. Exp. Sta. Bull. 292, p. 145). It as taken first in Canada in August, 1942, when it was found at three widely separated localities: at Niagara Falls, Ont., at Belleville on Lake Ontario, and immediately west of Montreal at Oka, Que. (see

Lechevalier, 1944, Le Nat. Canad., 71:210). In 1944 it was found on the St. Lawrence River near Brockville, Ont., and at additional localities in the Niagara District, but it was not detected during extensive collecting along the northeastern shore of Lake Erie. In 1945 it was found just east of Montreal at St. Lambert, and at Lacolle, Sutton, and Knowlton, Que., points to the south near the borders of New York and Vermont. While abundant locally, it did not occur generally in this region south of Montreal. The records suggest that the species has invaded Canada from several points in the United States. All Canadian collections have been made from willows, and some damage has been done to ornamental willows near Brockville.

Galerucella ribicola confusa n. subsp.

Much darker than typical *ribicola* Brown. Length 4 to 4.7 mm. Brownish-yellow; the vertex at middle usually reddish-brown, a little darker than the remainder of the head but never with a well defined spot; antennae colored as in *spiraeae* Fall, entirely pale beneath, but dark brown above except for the basal parts of the first four to six segments of each; pronotum reddish-brown at middle, this dark area of variable size, sometimes broken, usually quite distinct, much as in paler examples of *spiraeae*. Elytra reddish-brown, nearly always darker than in *spiraeae*, the general tone as in *perplexa* Fall but this broken by three yellowish vittae on each elytron; the vittae not conspicuous but distinct in part at least in all specimens of the type series; one vitta extending posteriorly from the humeral umbone, the others situated between that and the suture; the inner vittae narrower than the posthumeral and usually with few punctures, this giving the elytron a subcostate appearance; metasternum and abdomen more or less infuscate but usually not strongly so, legs entirely pale.

Food-plant: *Ribes americanum* Mill.

Holotype: ♂, Bell's Corners (near Ottawa), Ontario, June 28, 1945; No. 5632 in the Canadian National Collection.

Allotype: ♀, same data.

Paratypes: 35, same locality, June 4 to 28, Sept. 10, 1945.

All specimens were taken from the food-plant by the author.

G. spiraeae and *ribicola confusa* differ from species they approach in color in having the antennae entirely pale beneath but largely dark above. In nearly all specimens of the type series of *confusa*, the unique subvittate, subcostate appearance of the elytra is developed well enough to permit ready identification.

Typical *ribicola* and *confusa* differ strikingly, but specimens from intermediate localities are intermediate in color. Typical *ribicola* (1938, Canad. Ent., 70:37) is paler than any allied species. The body and appendages are very pale brownish-yellow. In a single paratype the pronotum is infuscate at middle, and in a few the apices of the distal antennal segments are feebly infuscate. The type series was taken at Aweme, near Brandon, in the grove belt of southern Manitoba, and the species has been reared on *Ribes americanum* Mill. (=*floridum* L'Her.) at Aweme. We have long series taken from *Ribes* sp., probably *americanum*, in the more northern, forested area of Manitoba, at Berens River and in Riding Mountain National Park. In these the color is a little darker; the vertex and pronotum at middle are usually feebly infuscate, and the antennae are yellow beneath but largely pale brown above. The pronotum and antennae average paler than in *spiraeae*, but the specimens are virtually inseparable by color from *spiraeae*. In none of the females, however, is the apical ventral segment incised as in most females of *spiraeae*. Most of the specimens taken by G. Stace Smith from *Ribes* at Duparquet, Que., situated near the Ontario Boundary and Lake Abitibi, are still a little darker. Some are as dark as specimens of *confusa;* in none are the elytra streaked with pale vittae as in *confusa*, although some have the subcostate appearance due to scarcity of punctures on the lines that appear as vittae or costae in *confusa*. This subcostate tendency is very feeble but evident in some specimens of the Manitoba series.

The types of *confusa* were taken with those of *Altica ribis* n. sp. which is described below. Like *A. ribis, confusa* appeared to be monophagous and to avoid the other species (see below) of Grossulariaceae that grew with its food-plant. The economic entomologists of Ottawa have no records of *Galerucella* on cultivated currants or gooseberries.

Altica potentillae n. sp.

Length of males 3 to 3.2 mm., of females 3.2 to 3.5 mm. Bronze; never with greenish reflections or with brilliant reflections of any kind; the color as in the most bronze individuals of *tombacina* Mann.; not strongly shining, the luster as in typical *tombacina;* antennae black, the basal segment of each metallic; legs metallic. Body a little more elongate than in many small species of *Altica,* its form as in *tombacina.*

Head and antennae as in *tombacina, corni* Woods, and *rosae* Woods, the antennae a little more slender than is usual in the genus. Pronotum more strongly convex before the antebasal groove than in *tombacina;* lacking a prescutellar lobe; very finely, sparsely punctate and very finely alutaceous; the antebasal groove strongly impressed, not attaining the lateral margins as in *corni* and *rosae;* disk a little less convex before the antebasal groove, the pronotum otherwise as in *corni* and *rosae.*

Elytra formed as in *tombacina,* more elongate than in *corni* and *rosae;* with moderately prominent humeral umbones and with a feeble impression within each umbone as in those species; moderately closely punctate except on the apical declivity, feebly alutaceous, the sculpture as in the most coarsely punctate individuals of typical *tombacina;* the epipleura evanescent opposite the apical abdominal segment.

Body beneath and legs sculptured as in the species mentioned above. Apical abdominal segment of the male much as in *corni* and *rosae;* flattened, sometimes very feebly concave, at middle; the median line usually polished, sometimes very feebly impressed; the apical margin feebly and broadly lobed. Tarsi feebly modified sexually; the first segment of each a trifle wider than the second but narrower than the third in both sexes; each first segment wider in the male than in the female, but very slightly so.

Male copulatory organ (fig. 1, 2, 3) reddish-yellow, its apex rounded; ventrally, with a strong carina on each side near the apex; the carinae not overhanging the depressed median area, not or scarcely distinct, even in balsam mounts, from the line limiting the deep lateral excavation on each side; the limiting line continued posteriorly to the foramen as a rugose ridge; laterally, the line limiting the excavation almost parallel to the dorsal and ventral margins; each straplike structure of the flagellum deeply incised on the outer side at middle.

Food-plant: *Potentilla Anserina* L.

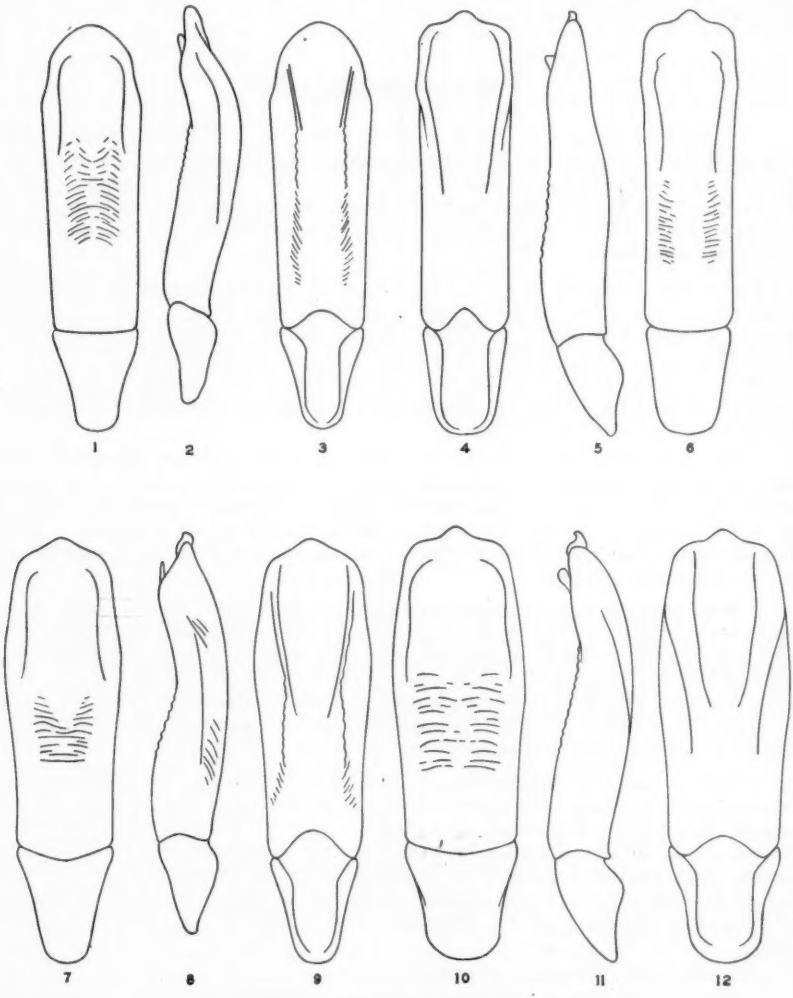
Holotype: ♂, Arnprior, Ontario, June 22, 1941; No. 5546 in the Canadian National Collection.

Allotype: ♀, same data.

Paratypes: 10 ♂, 12 ♀, same locality, taken on various dates in June, 1941 to 1943; 4 ♂, 3, ♀, Yamaska, Quebec, Aug. 28, 1945.

All specimens were taken from the food-plant by the author. The species has been observed for several years at stations near Arnprior. It seems to occur on the food-plant only where the latter grows on sand beaches. Each year the larvae have caused conspicuous damage to the potentilla during July and August, but they have not attacked *Fragaria virginiana* Duch. or other plants of the beaches.

In *tombacina* the body is larger than in *potentillae*, measuring from 3.8 to 4.2 mm. in length. *A. tombacina* and its subspecies *shoemakeri* Schffr. seem to occur only as females, all of our 41 specimens of the former and 80 of the



Male Copulatory Organs of *Altica*

Fig. 1, 2, 3, *A. potentillae* n. sp., dorsal, lateral, and ventral aspects respectively
4, 5, 6. *A. rosae* Woods, ventral, lateral, and dorsal aspects respectively.
7, 8, 9. *A. corni* Woods, dorsal, lateral, and ventral aspects respectively.
10, 11, 12. *A. ribis* n. sp., dorsal, lateral, and ventral aspects respectively.

latter being of that sex. Another species that occurs only as females, that identified as *aeneola* Blatch. by Gentner (1928, Trans. Am. Ent. Soc., 54:57-58), resembles *potentillae* but has the antennae and body stouter, the antebasal groove of the pronotum less strongly impressed, and, usually, greenish or brassy reflections that are always lacking in *potentillae*.

Altica ribis n. sp.

Separable from *corni* Woods and *rosae* Woods only by food-plant, color, and by sexual characters of the male. Dark coppery-bronze. Tarsi feebly modified sexually; the first segment of each slightly stouter in the male than in the female, equal in width to the second in the female, wider than the second but slightly narrower than the third in the male. Apical abdominal segment of male feebly lobed as in the allied species; broadly flattened on the median area; the flattened area feebly depressed in apical half, polished and without sculpture except on its sides and sometimes at base. Male copulatory organ (fig. 10, 11, 12) much as in *corni* (fig. 7, 8, 9); dark reddish-brown; wider than in *corni;* with the apex more strongly sinuate on each side and with the dorsal surface much less concave at middle than in *corni;* ventrally, the carina of each side broadly overhanging the depressed median area (very narrowly overhanging in *corni*), remote, even in dry preparations, from the line limiting the deep excavation of each side (in *corni* the carinae are distinct from the limiting lines in balsam mounts but not in dry preparations); in lateral aspect, the apex more strongly beaked, and the line limiting the excavation oblique, rather than subparallel to the ventral margin as in *corni;* straplike structures of the internal sac with their margins entire as in *corni* and *rosae*.

Length 2.9 to 3.4 mm., the largest specimens usually females. Strongly shining above; antennae black, their basal segments and the legs metallic. Elytra with moderately prominent humeral umbones, a feeble but distinct impression within each umbone.

Food-plant: *Ribes americanum* Mill.

Holotype: ♂, Bell's Corners (near Ottawa), Ontario, June 24, 1945; No. 5631 in the Canadian National Collection.

Allotype: ♀, same data.

Paratypes: 10 ♂, 68 ♀, same locality, June 14, 24, 26, 28, Sept. 10, 1945; 9 ♂, 6 ♀, Arnprior, Ontario, Sept. 8, 1945.

All specimens were taken from the food-plant by the author. The species occurred abundantly at both localities. It avoided entirely *Ribes glandulosum* Grauer, *Grossularia Cynosbati* (L.) Mill., and *G. hirtella* (Michx.) Spach., all of which grew with the food-plant at Bell's Corners. The economic entomologists of Ottawa have no records of *Altica* from cultivated currants or gooseberries. Males of *A. ribis* are scarce or entirely lacking in the series taken in late June but are numerous in the other series; they are evidently shorter-lived than the females. Some of the September specimens are teneral.

A. ribis can be separated always from *corni* by color. At first glance, *corni* appears definitely black but shows purple reflections, usually feeble but distinct, on closer examination. *A. ribis,* on the other hand, is a dark red-bronze, with an occasional specimen showing feeble greenish or brassy reflections. In *rosae* the color is often brassy or greenish, but some specimens match some of *ribis* quite well. In *corni* the tarsi are not modified sexually, both sexes having tarsi similar to those of the female of *ribis.* In *rosae* the tarsi are modified more strongly than in *ribis,* the first segment of each being considerably stouter in the male than in the female. The male copulatory organ of *rosae* (fig. 4, 5, 6) differs from those of other two species in being more slender, in being reddish-yellow instead of dark brown, and in being flattened rather than deeply excavated on each side.

Both *corni* and *rosae* are common and widely distributed in eastern Canada. Both have been taken from their food-plants at Riding Mountain National Park and at Norway House in Manitoba.

Psylliodes cucullata (Ill.)

Haltica cucullata Illiger, 1807, Magazin für Insektenkunde, 6:73, 172.

This European species was found in tremendous numbers in a meadow at Wishart Point, near Tabusintac, New Brunswick, in 1939 and 1940. It differs from *punctulata* Mels. and *convexior* Lec. in having the head scarcely visible

from above and in having the hind tarsi inserted at apical third, rather than one-fourth or one-fifth from the tibial apices. The body, especially the prothorax, is more convex. The legs, except for the hind femora, are entirely pale. In the male, the apical ventral segment is flattened but not impressed, and the first segment of each anterior tarsus is only a trifle wider than in the female. According to European authors, *cucullata* feeds on *Spergula arvensis* L.

The author has never seen another coleopterous insect as abundant as *cucullata* was in the meadow at Wishart Point. With it occurred in large numbers several species of *Sitona* Germ. and *Hypera* Germ., *Trachyphloeus bifoveolatus* (Beck), and *Rhinoncus castor* (Fab.), all introduced. The most striking thing about the coleopterous fauna of the general region is the large number and abundance of European species, including several that are restricted in America to maritime regions of eastern Canada (see Brown, 1940, Canad. Ent., 72:65-78).

SOME COLEOPHORIDAE OF EASTERN ONTARIO AND NORTHWESTERN NOVA SCOTIA*

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The spring of 1945 was in general very unfavorable for the majority of Lepidoptera in the Ottawa area, due apparently to the killing frosts and wet weather of the latter half of April and throughout May, following abnormally high temperatures late in March and early April. However Coleophoridae were the exception to this condition and the cases of this group were much more abundant than usual. The continued cold, dry, winter weather, without any of the customary alternating thawing and freezing spells was seemingly very suitable to the hibernating larvae; the early warmth stirred them out of their winter lethargy fully a month sooner than usual and their cases proved a protection against the subsequent cold. In consequence larval cases of a number of species which had heretofore not been secured in the Ottawa district were obtained and bred through to the adult; synonymical and biological notes based on such material together with results obtained in survey work in certain sections of Nova Scotia are the subject of the present paper.

Coleophora kearfottella B. & Bsk.

Coleophora kearfottella Barnes & Bsk., 1920, Contr. N. H. Lepid. N. Am., IV (3), 244; Heinrich, 1924, Mem. 68, Corn. Agr. Exp. Stn., 213; McDunnough, 1942, Can. Ent., LXXIV, 167.

Since discovering the cases of this species on Prince Edward Island we have been constantly on the lookout for them in other sections of the country. This year they occurred sparingly on *Salix bebbiana* at Bell's Corners, Ont., a small village about 10 miles southwest of Ottawa. Continued search produced about a dozen cases in this area and on two occasions single cases were also found on the same food-plant in East Ottawa; a series of three males and six females resulted, emergences occurring about the middle of June. The genitalia are closely allied to those of the "pistol-case" group, and the best position for the species would be immediately following *bella* Wlshm., a western species apparently very nearly related.

Coleophora rosaefoliella Clem.

Coleophora rosaefoliella Clemens, 1864, Proc. Ent. Soc. Phil., II, 426; Busck, 1903, Proc. Ent. Soc. Wash., V, 217; Heinrich, 1924, Mem. 68, Corn. Agric. Exp. Stn., 217.

Coleophora ciliaeochrella Cham., 1874, Can. Ent., VI, 129; McDunnough, 1942, Can. Ent., LXXIV, 168; *id.* 1944, *op. cit.*, LXXVI, 237 (*New synonymy*).

For the first time cases of this species which matched excellently the description given by Clemens were found on rose; the first cases were taken by me on April 11 in the eastern section of Ottawa, attached to the bases of leaf-buds but were scarce in this region; on April 12 and 13, however, they were found

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quite commonly in a large rose-patch at Aylmer, Que. The cases, as indicated by Clemens, are short, chunky and granular; they are curved downward apically for a short distance and the apex itself is flatly compressed, the terminal margin being convex. When found the cases were nearly full size and the larvae only fed for a week or ten days before attaching their cases for pupation; the adults emerged indoors during the first half of May. Clemens' description of the adult is rather misleading and has led Heinrich to place the species doubtfully in the wrong group; the antennae show merely *a short tuft* on the basal joint, the basal area of the forewings is white rather than the "pale grayish" mentioned by Clemens and the apical suffusion, while at times tending to the "dark brownish" of the original description, is generally quite distinctly light ochreous. The lighter specimens fit in so well with the original description of *ciliaeochrella* Cham., the doubtful identity of which I have discussed in a previous paper, that I feel justified in listing this name as a synonym. The proper position of the species is in the *cretaticostella* group. The species is evidently widespread; our collection contains several males from Annapolis and S. Milford, N. S., a long series of females taken by me in 1944 at Parrsboro, N. S., at dusk around rose bushes in late June and early July and two males and three females from Canim Lake, B. C., captured in 1938 by Messrs. Walley and Jacob.

Coleophora cretaticostella Clem.

Coleophora cretaticostella Clemens, 1860, Proc. Acad. Nat. Sci. Phil., 5; Busck, 1903; Proc. Ent. Soc. Wash., V, 192; Braun, 1919, Ent. News, XXX, 111; Heinrich, 1924, Mem. 68, Corn. Agr. Exp. Stn., 213.

Although a few adults of this species, as defined by Dr. Braun, had previously been captured in the Ottawa region, it was only in the spring of 1945 that a small colony of larval cases was located in East Ottawa, feeding on the leaf buds of blackberry. A dozen or so cases were taken on April 10 and others at somewhat later dates in the same restricted area; a few cases were also secured at Aylmer, Que., on April 13, feeding on rose along with *rosaefoliella*, this apparently being an alternate food-plant. The case is of the holster-type, although, after hibernation, the division between the two sections is rather blurred; its size is only slightly increased after the spring feeding starts, and pupation occurs in 1-2 weeks, the moths emerging during the latter half of May. In our bred series (from both food-plants) the forewings show little trace of white basal or inner-marginal suffusion, being a rather even dark fawn-brown with a prominent white streak along the costa. They agree, however, genitalically with specimens from Cincinnati, Ohio, kindly supplied by Dr. Braun, in which rather more white suffusion is evident.

Coleophora pruniella Clem.

In a recent paper (1946, Can. Ent. (1945), LXXVII, 146) I discussed the similarity of genitalia of several so-called species which I included in what I termed the "*pruniella*-group". This spring a number of the "holster-cases", characteristic of the group, were secured and bred through to the adult from a large variety of food-plants. The larva hibernates in the nearly full-sized case, feeding up for a couple of weeks in the spring and enlarging somewhat the size of the case by additions around the mouth; the cases are almost invariably found on the underside of the leaf during the feeding period, but are often attached to the upperside for pupation.

Cases of typical *pruniella* were found singly on *Prunus virginiana* and a series of 5 males and 3 females obtained; a single case was found at Aylmer on rose along with the cases of *rosaefoliella* and in due course produced a rather small male; another male emerged from a case on *Salix bebbiana*. A long series of 19 males and 17 females was secured from cases on yellow birch (*Betula lutea*) which were quite abundant on a row of trees in East Ottawa. Cases on aspen poplar (*P. tremuloides*) which were not rare but rather heavily parasitized, produced 3 males and 1 female and finally 6 males and 6 females emerged from the well-known cases on balsam poplar (*P. balsamifera*) to which the name *innotabilis* Brn. would apply.

In practically the entire bred series the color of the primaries was a deep gray-brown and only in odd females from birch and balsam poplar was there any trace of ochreous shading. Nothing could be found in the genitalia of either sex whereby the specimens from the individual food-plants could be separated; slight differences in the coloration of the cases probably are due to the leaf-texture and its reaction when drying.

In Riding Mt. Park, Man., cases were common in 1938 on both balsam poplar and aspen, the resulting moths showing no signs of ochreous suffusion. Under the circumstances the name *innotabilis* Brn. for the poplar feeder seems scarcely worthy of retention; in any case for the present I should certainly not advocate the creation of any new names in the group based on mere food-plant distinctions.

In July, while on Faunal Survey work in Nova Scotia, a few holster cases were found at Smith's Cove, Digby Co., on the underside of Alnus leaves; these had unfortunately already produced either adults or parasites but, on account of general similarity with the cases on birch, I presume they can be referred to *pruniella*. From British Columbia our collection contains specimens reared from cases on both willow and cottonwood and it might also be mentioned that in the original description of *piperata* Brn. from Utah (at best a pale race of *pruniella*), the author records both birch and willow as food-plants. A couple of small males reared from alder cases at Summerland, B. C., approach *piperata* in the paler coloration.

Coleophora dubiella n. sp.

Male. Palpi long, slender, slightly upturned, white, with second joint tinged outwardly with smoky-ochreous and with well developed apical hair-tuft ventrally. Head and basal antennal joint grayish-white, the latter scarcely tufted; balance of antenna white with rather weak, brown annulations. Primaries thin, pointed, dull white, variably tinged with smoky towards apex and above inner margin; in the holotype this suffusion is marked and the wing-apex is distinctly light smoky bordered below by a fine white line; in the paratypes the smoky color is less evident, possibly due to a rubbed condition of the specimens. Veins feebly outlined with light brown, the cubitus below and vein 1 above bordered by a faint yellowish shade, leaving a streak of the white ground-color through the fold. Costa white with extreme edge at base brown. Costal fringes pale brownish; other fringes deep smoky. Secondaries contrastingly deep smoky with paler fringes. Expanse 12 mm.

Genitalia. (fig. 1). Sacculus broad, concave and well chitinized, ventral margin terminating in a short, broad, upturned projection, caudal margin gently incurved and ending in a short, pointed spine which projects only a short distance over the ventral margin of the clasper; on the dorsal margin of sacculus, cephalad of this spine is a small tooth. Clasper narrow, projected moderately beyond apex of sacculus. Valvula weak and situated well cephalad of inner spine of sacculus. Aedeagus strengthened by lateral rods, that of the left side unarmed and terminating bluntly; the right side rod shows a small, upright, preapical tooth and a very minute, apical tooth as well. Vesica armed with a single long extremely thin spine. Gnathos oval, decumbent.

Holotype—♂, Parrsboro, N. S., July 3, 1944 (J. McDunnough); No. 5657 in the Canadian National Collection, Ottawa.

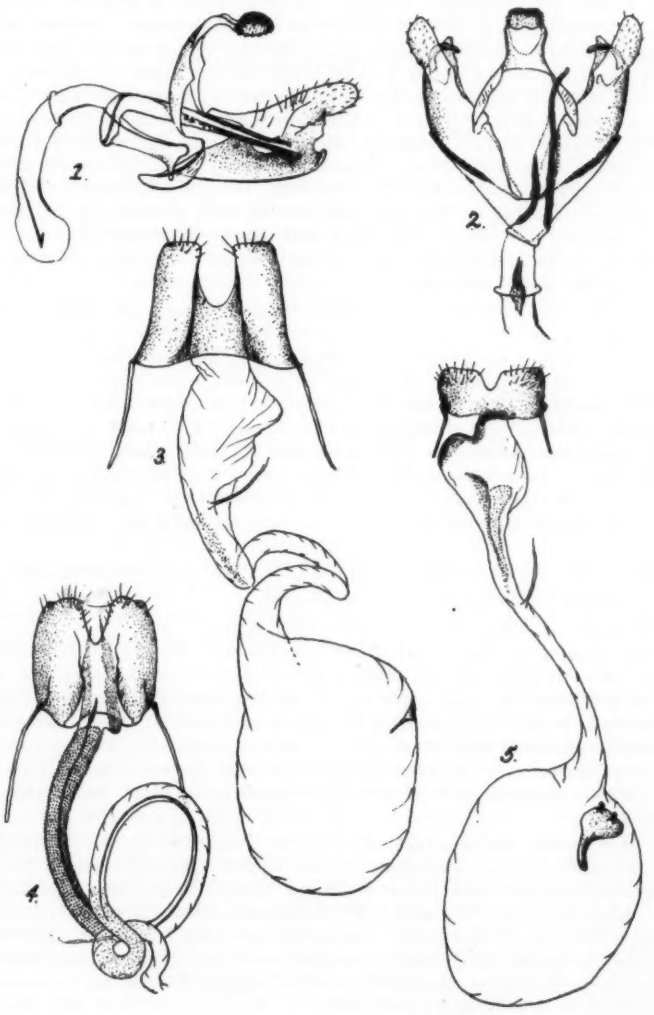
Paratypes—2 ♂, same data, July 3, 4.

Allied to *asterosella* McD., judging by the male genitalia, and can be tentatively placed in this group until females and cases are available.

Coleophora seminella n. sp.

Male. Palpi long, porrect, pale clay-color, second joint without apical tuft, third joint rather short and not upturned. Antennae with basal joint covered with clay-colored scales but not tufted, remainder dull whitish indistinctly annulate with brown. Head and thorax light clay-colored. Primaries

pale whitish ochreous or clay-colored, lightly sprinkled with dark atoms and heavily streaked with dull, light brown, leaving the costa and a band through the



Male Genitalia of 1. *Coleophora dubiella* n. sp.; 2. *C. seminella* n. sp
Female Genitalia of 3. *C. seminella* n. sp.; 4. *C. cervinella* n. sp.; 5. *C. rosaevorella,* n. sp.

fold of the pale color which is also more faintly perceptible along the radial veins toward apex of wing; inner margin rather broadly light brown. Costal fringes light brown, other fringes deep smoky. Secondaries with fringes deep smoky. Beneath deep smoky, the inner half of secondaries rather paler in coloration than costal half. Expanse 17 mm.

Female. Much paler than the male. Antennae non-annulate. Primaries dull white, sprinkled as in the male but with the brown longitudinal streaking narrowed and much more distinct, comprising a line below costa to middle of wing, another through the cell to just below apex and a third, somewhat broader, above inner margin, leaving the margin itself whitish; there are also obscure, brown, oblique streaks in the radial interspaces. Costal fringes and outer apical fringes whitish, others pale smoky. Secondaries light smoky with pale fringes; beneath the inner half of wing more distinctly whitish and rather sharply contrasted with the smoky costal section. Expanse 14 mm.

Genitalia. Male. (fig. 2). Gnathos large, upright. Sacculus strongly chitinized, concave, ventral margin slightly incurved at apex and terminating bluntly, caudal margin *directed obliquely dorso-cephalad*, terminating in a strong curved hook which projects beyond the dorsal margin of clasper. Valvula small, sparsely haired. Clasper rather short, projecting only moderately beyond sacculus hook. Aedeagus with right chitinized rod short and extending less than halfway to apex, right rod sinuate and *curving dorsad* at apex; vesica armed with *two small spines* on a chitinous base.

Female. (fig. 3). Genital plate helmet-shaped, scarcely broader than high, cephalic margin gently sinuate, caudal margin of each lobe straight, weakly setose, the two lobes separated by a broad, oval ostium, almost half the length of the plate. Initial portion of ductus chitinized, with edges slightly divergent to cephalic margin of plate; beyond the plate membranous and expanding into an irregular, gradually narrowing bulb, the inverted neck of which is feebly spiculate and from which the ductus seminalis arises. The terminal portion of the ductus forms a moderately broad tube somewhat irregularly convolute (possibly at times straight) which broadens somewhat on entering the large oval membranous bursa; signum of bursa a fine curved hook on a broader, chitinous base.

Holotype—♂, Parrsboro, N. S., July 3, 1944 (J. McDunnough); No. 5659 in the Canadian National Collection, Ottawa.

Allotype—♀, same locality, July 12.

The species is closely allied to *sparsipuncta* Heinr. with essentially the same type of genitalia. In the male organ, however, of *sparsipuncta* the caudal margin of the sacculus is at right angles to the ventral margin, the left rod of the aedeagus is longer and *strongly downcurved apically* and the vesica is armed with a small bundle of very weak spines. In the female the genital plate is much higher than broad, the bulbous portion of the ductus less bulging, and the *origin of the ductus seminalis* occurs *much further* down the tube than is the case with *seminella.*

I have before me several females from Bathurst, N. B. (June 26), which appear very similar to my Parrsboro female in both genitalia and maculation but are somewhat smaller and paler with less brown striation. Also two Ottawa females (May 31, June 11) and a Pt. Colborne, Ont., female (June 6) which are larger (18 mm.) but agree otherwise very closely. Until, however, males are available it would be unwise to assign these specimens to the present species. The larva is probably an aster-feeder and, judging by the early time of flight, may hibernate in a fully-fed condition.

Coleophora heinrichella McD.

Haploptilia heinrichella McDunnough, 1933, Can. Ent., LXV, 167.

Cases of this species were found in early July by T. N. Freeman, feeding on an *Aster* of the *cordifolius* group at Bell's Corners, Ont. A series of two males and four females resulted in late August and early September. The females, as noted in the original description, are frequently considerably more streaked on the veins with white and the costa itself is quite noticeably white, this pale color extending through the costal fringes to the apex of the primaries.

The occurrence of the species on *Aster*, along with the late time of emergence, leads to a suspicion that there may be a close connection with *asericola* Heinr. Mr. Freeman, after an examination recently of the female Holotype at Washington, confirms this suspicion, the wing pattern and type of larval case being fundamentally the same; unfortunately it was not possible to make a genitalic slide so the matter cannot be definitely settled until this is done.

Coleophora latronella McD.

Coleophora latronella McDunnough, 1940, Trans. Roy. Soc. Can., Sec. V, 55.

A good series of this species was bred in May and June from cases found on *Juncus* at Tweed, Ont., by G. S. Walley in the fall of 1944. The larval case, heretofore undescribed, is similar to that of *glaucicolella* Wood in that it lies practically flat on the surface to which it is attached, the mouth being deflected nearly 90°; it is, however, somewhat chunkier and very markedly triangularly compressed apically, resembling in this respect *unicolorella* Cham.; the basal two-thirds—a very characteristic feature—is well-covered with frass and particles of *Juncus* seeds. The larvae, when brought into a warm room after hibernation out-of-doors, crawl around without feeding for a day or two and then attach themselves to some object for pupation.

Coleophora cervinella n. sp.

Female. Palpi long, thin, second joint porrect, third joint sharply upturned; light ochreous with second joint outwardly light brown, except for a narrow ventral margin, and with well-developed brown ventro-apical hair tuft; third joint tinged ventrally with brown. Head, thorax and basal joint of antenna light brown, the latter smooth-scaled and untufted; balance of antenna ochreous white, annulate with brown. Primaries light brown, the costa narrowly whitish-ochreous; median and radial veins finely outlined in whitish-ochreous; in cell below median vein a few scattered dark and pale scales and scattered pale scaling along submedian fold. Costal fringes pale whitish-ochreous, other fringes smoky, deepening along inner margin. Secondaries and fringes deep smoky, the latter tipped with paler color. Beneath deep smoky with pale costa. Expanse 15 mm.

Genitalia. (fig. 4). Plate broad with gently rounded lateral edges; caudal edge with mere trace of lateral tooth and with deep median V-shaped excavation with ostium situated at its apex; cephalic margin characteristically lobed laterally with broad, shallow central evagination. Central portion of plate somewhat raised with shallow hollows on each side of the median area. Ductus bursae at its inception and in the area below genital plate rather poorly defined, the lateral edges showing apparently a membranous thickening but no definite chitinization. Immediately cephalad of the plate the ductus narrows to a fine tube, the initial portion directed slightly to the left and comprising a dark spiculate section with central, hair-spring-like, chitinous band; beyond this the tube describes a large convolution through which the hair-spring still runs, then a much smaller convolution, the membrane becoming slightly spiculate! from this section the ductus seminalis takes its inception. After three or four half-convolutions the ductus enters the broadly oval bursa which is furnished with the usual small hook-like signum and a thin, but distinct, spiculate, chitinous bar.

Holotype—1 ♀, Parrsboro, N. S., July 4, 1944 (J. McDunnough); No. 5658 in the Canadian National Collection, Ottawa.

Paratype—1 ♀ (?), (abdomen lost), same locality, July 3.

The species has somewhat the appearance of *polemoniella* Brn. but differs radically in genitalia and apparently belong in the *duplicis group*. The two specimens were taken at dusk along the edge of the salt meadows near the Ottawa House.

Coleophora bidens Brn.

Coleophora bidens Braun, 1940, Can. Ent., LXXII, 182.

In her original description Dr. Braun gives the food-plant of the larva as *Aster umbellatus*. This species of *Aster* is very plentiful in certain sections on the eastern outskirts of Ottawa and in early October of 1943 a search on the seed-heads of this plant resulted in the finding of a large number of Coleophorid cases which were presumed to belong to this species as they fitted well with the author's description of the case Unfortunately, due to unsatisfactory methods used in storing the hibernating cases, hardly any adults were secured, only 5 males and 3 females emerging in late July or early August of 1944 from over 100 cases. The same fall further search was instituted for the cases but they were very scarce and not more than a dozen were found. These were hibernated in cold storage at a temperature of about 20° and brought into a warm room in late March, 1945. Emergence was quite satisfactory, the moths appearing singly over a period ranging from late May to early July, 3 males and 6 females being thus obtained. This fall the cases were again found in numbers and it is hoped that a long series of adults will result in 1946.

As regards the cases it was found that the immatures ones were almost entirely concealed by the pappus of the seed-head; they were roughly cylindrical, tapering slightly toward their apices but not very definitely two-valved; usually each case showed a small apical opening, partially covered by pappus. Two distinct color-forms of case were noted, at times both types present on one seed-head; in the one instance the case was entirely black and in the other a light ochreous-brown but the cause of the difference in coloration remained obscure.

The mature case is enlarged, as indicated by Dr. Braun by "lengthwise splitting and filling in with paler brown silk"; this procedure was most noticeable in the dark cases which become alternately striped with black and ochreous whereas the pale cases remain almost unicolorous. All the full-sized cases are quite chunky and very definitely three-valved; they are very variably covered with pappus and apart from coloration no differences could be noted. When ready for hibernation they may remain, attached to a seed, in the central portion of the head, or wander to the outer base of the receptacle; in the breeding tins they frequently attach themselves to the edges of the covers.

With the idea of checking as to whether the color of the case had any specific value, the two types of cases were kept separate. As a result our series contains four males and three females which emerged from the dark cases and four males and five females from the light ones. Both series show nothing tangible in coloration and maculation of primaries which would indicate a specific difference; as noted in the original description the costal half of the forewing is predominantly whitish with thin streaks of brown, especially apically; the inner half is largely brown separated into two areas by a white streak through the fold; weak dark sprinkling occurs apically and along the fold but may be almost entirely missing. Our specimens agree on the whole quite well with paratypes received from Dr. Braun.

As a further check genitalic slides have been prepared of almost our entire series with rather confusing results. Of the four males from the dark cases none showed a median tooth on the right side of the aedeagus but in all a *small* subapical tooth was present, although in one specimen this tooth was considerably more proximad than in the other three; this would throw the specimens into *subapicis* Brn., except for the fact that the tooth is not nearly as large as shown in Braun's figure and that the food-plant of this species is given as *Aster infirmus*, a species which does not occur with us, although definitely allied to *umbellatus*. Of the four males from the brown cases, one showed *both subapical and median teeth* on the right side, the median tooth being quite minute; another male showed *only a fairly well-developed median* tooth; in a third male a small *subapical tooth* was present with possibly the merest indication of a median one and in the fourth specimen a *strong subapical tooth* formed the armature, this last

specimen being closer to Braun's figure of *subapicis* than any of my other slides. In all specimens examined the great length of the claspers as compared with those of allied species was quite striking and is one of the best diagnostic characters.

Of the female genitalia I have made two slides from black-case specimens and three from brown ones as well as a slide from a single captured female. While there is a certain amount of variation in the individual specimens they all agree moderately well with Braun's figure of *bidens*, although there is more of a tendency for the right edge of the initial portion of the ductus bursae to be rigidly straight and for the distal half of the left side to bend more to the left than is indicated in this figure. Most characterstic to my mind as a means of separation from other allied species (*ericoides, duplicis*, etc.) is the *greater depth and width* of the U-shaped ostium, the *broader distal portion of* the first section of the ductus bursae, the *very large first convolution* of the median section of the ductus and the larger bursa. The lateral and median lobes on the caudal margin of the genital plate are usually well-developed with a tendency for the median lobes to converge slightly; there is, however considerable variation in their actual size and their relative positions and they can only be used with caution as specific characters. The same is true of the spiculate section of the ductus which is usually quite long (longer than in other species); however in dwarfed specimens it is at times quite short.

As I cannot bring myself to the belief that the differences noted above in the spining of the male aedeagus are of specific value nor that the color of the larval cases has much to do with the matter, I am more or less forced to the conclusion that we are dealing with a single species, variable in respect to the size and number of teeth on the male aedeagus, for which I employ the name *bidens* Brn. I have seen no authentic material of *subapicis* Brn. and the relationship between these two so-called species remains to be worked out. It is to be hoped that this can be done by Dr. Braun; it would be most interesting to learn whether topotypical material of *bidens* shows the same variability, when series are available for examation, as does our Canadian species I am placing under this name.

In conclusion it might be mentioned that at Parrsboro, N. S., where I collected in the years 1943 and 1944 during July and August, *Aster umbellatus* grows in extraordinary profusion along the roadsides. I secured long series of specimens of the present species in August flying at dusk around the aster plants or resting in the foliage; this included six pairs taken *in coitu*. These Parrsboro specimens are slightly larger than my bred material from Ottawa; the color of primaries is a more uniform grayish or ochreous brown, with considerably less extended whitish areas (as a general rule) in the costal half of wing and the secondaries are frequently quite dark. In these respects they fit in better with the original description of *subapicis* than that of *bidens*, but I am using the latter name pending more definite knowledge of *subapicis*. Genitalic slides of these show in the male sex one specimen in which the spining on the right side of the aedeagus is absent; three specimens with subapical spine and no median one, in one of these the spine further proximad than normal; one specimen with both subapical and median spines, the latter very small, and one specimen with well developed median spine but no subapical one. The same variability occurred in slides from captured specimens.

Coleophora laurentella McD.

This species, a member of the *annulicola* complex, was recently described (1944, Can. Ent., LXXVI, 109) from a single female bred from a case found on a grass-stem at Eel River, N. B. At Parrsboro, in 1944, cases were not uncommon feeding on *Aster novi-belgii* growing in profusion on the edges of the salt-meadows, and a good series of adults was bred. The females matched the type excellently in the pale white coloration and distinct brown longitudinal striation of the primaries; the males were somewhat darker, but still definitely striate.

Besides the bred specimens a long series of both sexes was captured in the early evening flying around or sitting on plants of *Aster novi-belgii*. Slides made of the genitalia show that those of the male—as was to be expected — scarcely differ from those of *asterophagella* as figured (*op. cit.*, fig. 2); the female genitalia match my figure 8 extremely closely, notably in the depth of the median excavation of the caudal margin of the genital plate.

Coleophora rosacella Clem.

Coleophora rosacella Clemens, 1864, Proc. Ent. Soc. Phil., II, 426; Busck, 1903, Proc. Ent. Soc. Wash., V, 217; McDunnough, 1940, Trans. Roy. Soc. Can., Sec. V, 66, Pl. II, fig. 3.

Mr. T. N. Freeman, on a recent visit to Philadelphia, was able to check on the genitalia of the male Holotype in the Academy Collection. They were found to agree with the figure given by me in 1940; the verification of the identity of the species is important as there is another very similar species, practically undistinguishable in maculation, the cases of which occur also on rose; the genitalia of this latter species are abundantly distinct, however, from those of *rosacella*.

As far as our Canadian records go typical *rosacella* is only known to occur in the Maritime provinces; we also possess specimens, bred from rose, from Augusta, Me., through the kindness of Dr. Brower.

Coleophora rosaevorella n. sp.

Palpi, head and thorax pale smoky. Antennae with the basal joint pale smoky and very faintly tufted, remainder white, very sharply annulate with brown. Primaries deep mouse-gray with a somewhat diffuse dull whitish streak along the costa, extending to the costal fringes; these fringes deeper in color than the wing which pales slightly in the apical area and shows faint traces of darker sprinkling. Secondaries and fringes concolorous. Expanse 12 mm.

The male genitalia are practically the reverse of those of *rosacella*. As in this species there is *no membranous clasper* but a well-chitinized broad, subrectangular sacculus; its straight, ventral margin ends in a small rounded projection from the base of which the caudal margin continues at right angles, terminating in a *long, strongly downcurved caudo-dorsal hook*, the hooks of the two sides being practically symmetrical; this at once distinguishes it from *rosacella* which has *symmetrical caudo-ventral* hooks. The gnathos is upright. The aedeagus lacks the two long twisted rods, terminating in short hooks, of *rosacella*, and is instead rather short and terminates in a *single stout down-curved hook*, attached to the strongly chitinized twisted right rod, the rod of the left side is much shorter, bends across the right rod and is drawn out to a point apically.

The female genitalia (fig. 5) shows a broad, very short, genital plate which is more than twice as broad as high, rectangular in shape with a small U-shaped central excavation on caudal edge and with its cephalic edge forming a more strongly chitinized lip. In the centre of this lip the rather small ostium is situated which at once expands into an irregularly shaped bulbous ductus, the left side of which is sinuate and chitinized for half its length, the bulb being otherwise membranous. This section is continued as a long, straight, narrow membranous tube to the bursa, its initial section containing a weakly chitinized and spiculate bar which has its inception in the distal portion of the bulb. The bursa is small, oval, membranous with the signum a curved hook on a broad chitinous base from which *two small, but very characteristic knobs* project to the outside of the bursa membrane.

From *rosacella* which has a similar small genital plate the present species can be superficially distinguished by the fact that it lacks a large chitinized plate which more or less covers the ostium-mouth in *rosacella* and forms, with an initial chitinized section of the ductus, a funnel, the apex of which bends to the left.

The larval case is small, brown, cigar-shaped, with the apex triangularly compressed. Length, 6 mm.

Holotype— ♂, Aylmer, Que., May 15, 1945 (T. N. Freeman) (bred from rose); No. 5656 in the Canadian National Collection, Ottawa.

Allotype—♀, same data, May 4.

Paratypes—8 ♂, 8 ♀, Parrsboro, N. S. (various dates between July 3 and 19, 1944, J. McDunnough).

The two Aylmer cases were taken along with those of *rosaefolielia*, the species being apparently rare in this region. At Parrsboro it was, however, quite common, being the predominant rose-feeder to the practical exclusion of *rosacella*, of which only a single female was captured. Worn specimens appear much paler, due to the wearing off of the dark scaling; in consequence the pale costal area is scarcely evident.

Coleophora concolorella Clem.

Coleophora concolorella Clemens, 1863, Proc. Ent. Soc. Phil., II, 6; Chambers, 1874, Can. Ent., VI, 129; Busck, 1903, Proc. Ent. Soc. Wash., V, 210; Heinrich, 1924, Mem. 68, Corn. Agr. Exp. Sta., 210.

Coleophora unicolorella Chambers, 1874, Can. Ent., VI, 129; Braun, 1914, Jour. Cin. Soc. N. H., XXI, 163; McDunnough, 1942, Can. Ent., LXXIV, 171, Pl. XIII, figs. 3, 4; *id.* 1945, *op. cit.*, 239. (*New synonymy*).

Judging by Mr. Freeman's notes on the male type at Philadelphia, its coloration and as much of the genitalia as could be seen under a binocular without making a slide, the name *concolorella* Clem. will take priority over *unicolorella* Cham. in spite of what Chambers says in his description of this latter species. It must be admitted that Clemens' description of the wing-color as "dark yellow-ochreous" is misleading as the color of the "type" is a deep mouse-brown, much as in *rosacella;* some specimens before me do, however, have an ochreous tinge in certain lights and Clemens' specimen, when fresh, may have shown this. The characteristic genitalia with the broad, upturned, ventral projection of the sacculus, as illustrated by me (1942), together with the small size (10 mm.), leave little doubt as to the identity and dispose satisfactorily of another one of the troublesome "unknowns".

A NEW SPECIES OF *DELPHACODES* FROM ALBERTA (FULGOROIDEA)

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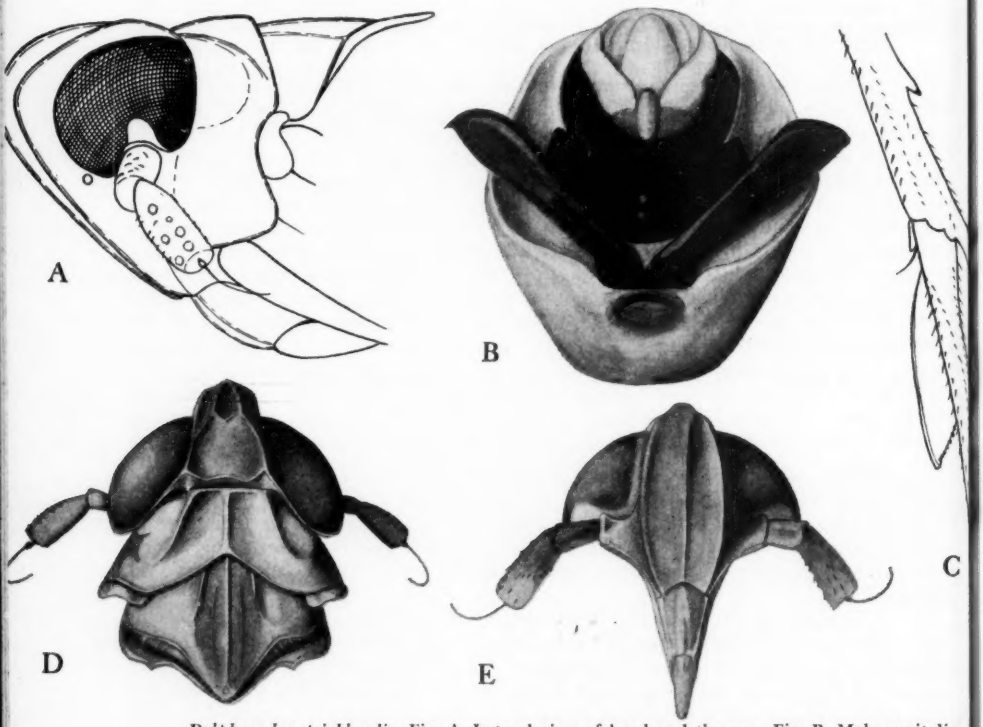
Among the many interesting Homoptera which have been sent to me by Professor E. H. Strickland is a series of an unusual *Delphacodes* collected at Cooking Lake, Alberta. This distinct little species is described at this time in order to stimulate further collection of these inconspicuous but interesting insects from western Canada, where there must be many more new species as yet unrecorded.

The status of the genus *Delphacodes* is somewhat in doubt at the present time. This name was first proposed as a sub-genus to *Delphax* in 1866 by Fieber 1866a:524. Kirkaldy in 1904a:177 proposed that *Delphacodes mulsanti* Fieb. be selected as the type of this genus, and it has been in this sense that the genus has been used with increased frequency since that time, replacing the name *Liburnia* of authors and the name *Delphax* of authors. Neither of these names should be confused with the true *Liburnia* Stal with its logotype *Delphax vitticollis* or with the true *Delphax* Fabricius which is the same as *Araeopus* Spinola and has as its type *Delphax crassicornis*. I believe that *Delphax* should be replaced by *Araeopus* Spinola. Even though we grant that the International Commission of Zoological Nomenclature was correct in assuming that *Delphax* of Wahlbaum is an invalid name; Wahlbaum's name clearly has priority over Fabricius' name and both were quite evidently proposed as genera. It would seem, therefore, much simplier to decide that invalid names in any category render the further use of that name invalid or untenable. This, however, has nothing to do with the accepted name for the group that was catalogued by Metcalf 1943a as *Delphacodes*. The further history of this name is somewhat involved and needs considerable more study before it can be entirely cleared up. Haupt 1935a:134 places *mulsanti* Fieber in the genus *Megamelus*. This led Ossiannilsson 1942b:

113 to suggest that the name *Delphacodes* was, therefore, a synonym of *Megamelus* Fieber, and that *Delphacodes* Fieber will have to be replaced by *Calligypona* Sahlberg 187a:408. *Calligypona* Sahlberg has as its haplotype *Calligypona albicollis,* which is according to Haupt 1935a:141 a synonym of *Liburnia reyi* Fieber. First of all it needs to be determined whether *mulsanti* Fieber really belongs to the genus *Megamelus* Fieber as exemplified by its type *Megamelus notula* Gemar. In the second place it should be determined whether *Calligypona albicollis* Sahlberg is truly a synonym of *Delphax reyi* Fieber. There has been so much confusion in this group in the past because students have placed too much reliance on the so-called chrotic or superficial characters and not enough emphasis upon the phallic characters, not



Delphacodes stricklandi. Fig. A. Lateral view of head and thorax. Fig. B. Male genitalia, posterior view Fig. C. Tarsi with calcar. Fig. D. Dorsal view of head and thorax. Fig. E. Facial view of head.

only for the delimitation of species but also for the limitation of genera. Unfortunately I do not possess at the present time typical specimens of all these species, and I cannot, therefore, settle these points. But judging by the descriptions and illustrations which are available, I do not believe that this synonymy is correct. I will, therefore, continue to consider the genus *Delphacodes* Fieber valid until the whole matter can be studied and verified or denied.

Delphacodes stricklandi n. sp. (Figs. A–E)

This is a pale ochraceous buff species with the basal area of the dorsal segments of the male abdomen blackish or blackish fuscous and the diaphragm and genital styles fuscous to blackish, the tarsal claws blackish, and the compound eyes clouded with fuscous. The female is nearly uniformly pale ochraceous buff, with the compound eyes clouded with fuscous.

Carinae of head and thorax conspicuous; the median carina of the face forked slightly below the anterior margin of the crown. The forks of the median carina not strongly divergent on the crown to the middle where they are suddenly curved outward and join the lateral margin of the crown just before the apex. The median carina strongly developed, the lateral carinae strongly developed and divergent, not reaching the posterior margin. Carinae on the mesonotum not strongly developed. Antennae moderately long for this genus; the first segment terete, more than half as long as the second segment which is more robust and somewhat flattened. Both segments studded with numerous short spines. The flagellum at the base is rather stout and elongate, nearly as long as the basal segment of the antennae.

Male pygofer short and broad; the lateral margin nearly circular, with a shallow median ventral sinus; the outer chamber shallow, the inner chamber deep; diaphragm apparently thick; with a strong medium triangular genital spine. Genital styles flat, elongate, exceeding the lateral margins of the pygofer, diverging at an angle of about forty-five degrees from the ventral margin, slightly widened apically, and then suddenly narrowed to an acute recurved tooth at the apex. The anal segment short; anal spines wanting. Anal style almost included within the anal segment.

Holotype ♂: Cooking Lake, Alberta. June 6, 1937, F. C. Morrison.

Allotype ♀: Cooking Lake, Alberta. June 6, 1937, F. C. Morrison.

Collected on *Amaranthus elapious*, family Amaranthaceae.

Paratypes, 4 ♂ ♂ and 8 ♀ ♀: Cooking Lake, Alberta. June 13 and June 20, 1937, F. C. Morrison.

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NOTE ON CERTAIN *DICHRORAMPHA* SPECIES (LEPID., LASPEYRESIINAE) *

BY J. McDUNNOUGH
Ottawa, Ont.

Dichrorampha simulana Clem.

Judging by the genitalic figure (based on an Ottawa male), given by Heinrich in his revision (fig. 276) and by the remarks in the text (p. 12) the species has been — at least partially — misidentified by this author. Clemens' type (selected by Fernald) is a specimen from Baltimore, Md., in the Academy collection at Philadelphia; the specimen is unfortunately without abdomen but has recently been very carefully examined by Mr. T. N. Freeman who selected a male specimen from Oak Station, Pa. (Marloff) as almost exactly matching this type. The genitalia of this male do not, however, agree with Heinrich's figure as the 'outer margin of the basal opening' of the clasper is *not* produced into 'a short tongue or spur' nor does the aedeagus belong to the type illustrated. In fact the genitalia of this Pennsylvania specimen are so close to those of the western *britana* Bsk. as to raise considerable doubt in my mind as to whether the two names should be kept apart; they might easily represent eastern and western races of a single species.

*Contribution No. 2424, Division of Entomology, Science Service, Department of Agriculture, Ottawa.

Corresponding in genitalia with the above-mentioned specimen there is before me a series from Parrsboro, N. S., Aug. 9-12, 1943, and others taken in July and August, 1944, and considerable material from other sections of the Maritime Provinces (S. Milford, Annapolis, Petite Riviere, White Pt. Beach, N. S.; Waweig, St. Andrews, Tabusintac, Bathurst, N. B.; Dalvey House, P. E. I.). These specimens are rather smaller than typical and the yellow spot at middle of inner margin is generally more sharply defined outwardly but in a few specimens I can detect the yellow outward suffusion characteristic of typical *simulana* and especially of its synonym, *aurisignana* Zell., (*vide* Zeller's original description).

It might be noted that in 1944 all the specimens captured at Parrsboro, N. S., were associated with beach-pea, being flushed out of clumps of this plant.

A good specific character, not mentioned by Heinrich, is found in the aedeagus, whereby the various species with costal fold may be separated into two groups. In the one group the chitinized apex of the aedeagus is more or less cylindrical with the edges projecting slightly ventrad and terminating in blunt points, the membranous portion being completely ventral; this includes *kana* Bsk., *britana* Bsk., and what I call the true *simulana* and can be fairly well recognized in Heinrich's figure 275. In the other group which contains *britana* Bsk. and Heinrich's false *simulana* the left side of the aedeagus is chitinized for a considerably greater length than the right side; in consequence the membranous portion is situated laterally on the right side; there is also generally (but apparently not quite constantly) a small dorsal preapical spine on the left side; this is faintly visible in Heinrich's figure 276.

Our Ottawa series and other specimens from adjacent regions of Ontario and Quebec all agree in genitalia with Heinrich's fig. 276; apart from genitalic characters I can find no satisfactory character of maculation on which to separate them from true *simulana*; as noted by Heinrich they may readily, however, belong to a northerly form of *bittana* in which the yellow spot is more sharply defined, as there is great similarity in male genitalia. Our material of this latter species is too scanty to arrive at any definite conclusion, it being represented by only four specimens from the Niagara region of southern Ontario, two of these bred from larvae in the root-stalks of an *Aster* sp. near *lateriflorus*.

From Parrsboro and other sections of Nova Scotia we possess series of specimens which agree in genitalia with our Ottawa specimens but lack the yellow spot on inner margin either entirely or almost so; such a form occasionally occurs in Ontario but in the Maritime provinces it is apparently the only one met with. Pending the time when it will be possible to straighten out satisfactorily the various relationships in the group I am describing it as a new species, although eventually it may have to be relegated to subspecific rank.

Dichrorampha immaculata n. sp.

Ground-color of forewings similar to that of *simulana* but the yellow spot at middle of inner margin entirely lacking or very obscure. The sprinkling of light-colored scales in the apical section of the wing, surrounding the oblique dark streaks from costa, and also along the terminal margin in connection with the dark dots, is somewhat reduced in extent and considerably darker in color than the pale yellow sprinkling of *simulana*, the color in most specimens, showing a decided orange tinge. The size is slightly smaller and the small notch in the outer margin of primaries below the apex seems somewhat weaker than is the case in *simulana*. The male genitalia are of *bittana*-type.

Holotype — ♂, Parrsboro, N. E., Aug. 9, 1943 (J. McDunnough); No. 5545 in the Canadian National Collection, Ottawa.

Allotype — ♀, same locality, July 23, 1944 (J. McDunnough).

Paratypes — 4 ♂, Parrsboro, N. S., Aug. 13, 16, 1943 (J. McDunnough); 7 ♂, 1 ♀, same locality, Aug. 4, 1944; 2 ♂, 1 ♀, White Pt. Beach, N. S., Aug. 14, 17, 19; 3 ♂, 1 ♀, Baddeck, N. S., July 29, Aug. 1, 3 (J. McDunnough).

In 1944 a long series was captured on August 4 in a clearing in the woods where they were flying around *Viburnum cassinoides* and settling on the foliage. As there was plenty of *Aster umbellatus* growing in the area it is possible that this was the food-plant.

BOOK NOTICE

The Nearctic Species of Tendipedini (Diptera, Tendipedidae (=Chironomidae)). By Henry K. Townes Jr. The American Midland Naturalist, vol. 34, no. 1, pp. 1-206. July 1945. (University Press, Notre Dame, Indiana. $1.00 postpaid).

It is probable that, since the publication of Malloch's 1915 monograph, a great deal of tendipedid material has accumulated in public and private collections in North America, awaiting the appearance of a comprehensive review of the commonest and most abundant forms in this family, those comprising the large and widespread genus *Chironomus* of the old authors. Dr. Townes' fine work now comes to fill this need. The forms dealt with under the tribal name Tendipedini (Chironominae, excl. *Tanytarsus*, of Edwards 1929, and Chironomidae couplets 26 and 27, excl. *Tanytarsus*, of Curran 1934) include all the genus *Chironomus* of the older authors, as well as its closest allies having a fringe of hairs on the squama, and the anterior cross vein clearly defined and oblique to the long axis of the wing. Although only the adults are dealt with by Dr. Townes, the systematic arrangement, which is modified from Goetghebuer's (1937) treatment in "Die Fliegen der Palaearktischen Region", takes into account the greatly increased knowledge that we now have of group relationships, based on studies of the immature stages by Dr. Johannsen and a number of European workers. There are, no doubt, some dipterists who will disagree with Dr. Townes in his recognition of 15 groups of Tendipedini having full generic status, yet there can be no doubt that an arrangement showing more clearly the natural relationships between species is long overdue in the North American literature. Dr. Townes has studied nearly all the types of the Nearctic forms, and 36 species now go into synonymy including several described from European material. Described as new are 104 species; 15 Old World species are reported for the first time from the Nearctic region. These together with 82 previously described Nearctic species make a total of 201 species dealt with in this revision. Twenty-four described species are listed as still unrecognizable, of which half are Walker's Albany River species. Dr. Townes' introductory paragraphs contain a discussion of terminology and some remarks on the relative values of taxonomic characters, some advice on collection and preservation of material, and a word of warning on the unreliability of local faunal lists. They conclude with a short valedictory to the old name "Chironomidae," the suppression of which Dr. Townes finds "unfortunate." This is no doubt a case of masterly understatement, made strictly as an international gesture of scientific phlegm. The work is profusely illustrated with 261 figures, most of them drawn by the author's wife (Dr. Marjorie Chapman Townes), and a check list and index are included.

G. E. Shewell.

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